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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/673,271	11/28/2000	Ernst Eberlein	40999	3541

7590

03/05/2004

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EXAMINER

BAYARD, EMMANUEL

ART UNIT	PAPER NUMBER
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2631

28

DATE MAILED: 03/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/673,271

Applicant(s)

EBERLEIN ET AL

Examiner

Emmanuel Bayard

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 October 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 47-92 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 47-92 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 5.7.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 47-54, 70-77 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seki et al U.S. patent No 5,694,389 in view of Seki U.S. Patent No 5,771,224.

As per claims 47, 50, 70, 73, Seki et al discloses a method for generating a multi-carrier modulated signal having a frame structure, each frame of said frame structure comprising at least one useful symbol, a guard interval associated to said at least one useful symbol and a reference symbol, said method comprising the steps of: OFDM carriers symbol or QAM or QPSK symbols are considered as the claimed (providing a bit stream) (see abstract and figs. 1-4 and col.4 lines 20-45, 60-67 and col.51-10, lines 20-30); mapping (see figs. 4, 15, 17 elements 203, 1303 and col.5, line 48 and col.11, line 65) bits of said bit stream to carriers in order to provide a sequence of spectra; performing an inverse Fourier transform (see figs. 4, 15, 17 element 208 and col.5, lines 29-30,63-67, in order to provide multi-carrier modulated symbols); associating a guard interval (see figs. 4, 15, 17 element 209 and col.5, lines 65-67 and col.6, lines 1-3) to each multi-carrier modulated symbol; generating said reference symbol (see fig.4 elements 206, 1102, 1305 and col.5, line 55) by performing an amplitude modulation of a bit sequence, the envelope of the amplitude modulated (see col.5, lines 49-55) bit sequence defining the reference pattern of said reference symbol; associating said reference symbol to a predetermined number of multi-carrier

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modulated symbols (see col.5, lines 50-67) and associated guard intervals in order to define said frame (see fig.7 and col.4, lines 15-25 and col.5, lines 65-67 and col.6, lines 1-3).

However Seki "389" does teach inserting said amplitude modulated bit sequence into said signal as said reference symbol.

Seki "224" teaches inserting said amplitude modulated bit sequence into said signal as said reference symbol (see col.2, lines 10-40).

It would have been obvious to one of ordinary skill in the art to implement the teaching of Seki into Seki as to correct the transmission frame according to the detected variations in amplitude and phase of the received signal as taught by Seki "224" (see col.2, lines 20-25).

As per claims 48, 51, 71, 74 Seki "389" does teach said multi-carrier modulated signal is an orthogonal frequency division multiplex signal (see abstract).

As per claims 49, 52, 72, 75 Seki "389" would include wherein said amplitude modulation is performed such that a mean amplitude of said reference symbol substantially corresponds to a mean amplitude of the remaining multi-carrier modulated signal as to correct the transmission frame according to the detected variations in amplitude and phase of the received signal as taught by Seki "224" (see col.2, lines 20-25).

As per claims 53, 76 Seki "389" does include wherein said bit sequence is a pseudo random (see col.5, lines 1-3) bit sequence having good autocorrelation (see fig.3 element 318) characteristics.

As per claims 54, 77 Seki "389", wherein a number of useful symbols in each frame is defined depending on channel properties of a channel through which the signal or the multi-carrier modulated signal is transmitted as to correct the transmission frame according to the

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detected variations in amplitude and phase of the received signal as taught by Seki "224" (see col.2, lines 20-25).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 55-60, 78-83 are rejected under 35 U.S.C. 102(e) as being anticipated by Seki et al U.S. Patent No 5,694,389.

As per claims 55, 78 Seki teaches a method for frame synchronization of a signal having a frame structure, each frame of said frame structure comprising at least one useful symbol, a guard interval associated with said at least one useful symbol and a reference symbol, said method comprising the steps of: receiving said signal (see fig.5); down-converting said received signal (see fig.5 element 301); performing an amplitude-demodulation (see fig.5 element 303) of said down-converted signal in order to generate an envelope (see fig.5 element 314) ; correlating (see fig.5 element 318) said envelope (314) with a predetermined reference pattern in order to detect the signal reference pattern of said reference symbol in said signal; and performing said frame synchronization (see fig.5 element 322 and col.4, lines 20-25) based on the detection of said signal reference pattern.

As per claims 56, 79 Seki teaches the step of performing an AFC automatic frequency control. Therefore the step of performing a fast automatic gain control of said received down-

converted signal prior to the step of performing said amplitude-demodulation is inherently included in Seki.

As per claims 57, 80 Seki teaches wherein the step of performing said amplitude demodulation comprises the step of calculating amplitude of said signal (see fig.5 element 314).

As per claims 58-59, 81-82 Seki teaches further comprising the steps of sampling (see fig.5 element 302) respective amplitudes of said received down-converted signal and comparing (see fig.5 element 315 and col.7, lines 8-15) said sampled amplitudes with a predetermined threshold in order to generate a bit sequence in order to perform said amplitude demodulation.

As per claims 60, 83 Seki teaches, further comprising the step of applying a result of the frame synchronization for a frame (see col.4, lines 20-29) in said signal to at least one subsequent frame in said signal.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 61-69 and 84-92 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa et al U.S. Patent No 5,646,935 in view of Seki et al U.S Patent No 5,694,389.

As per claims 61, 84 Ishikawa et al teaches a method for frame synchronization of a multi-carrier modulated signal having frame structure, each frame of said frame structure comprising at least one useful symbol, a guard interval associated to said at least one useful symbol and a reference symbol, said method comprising the steps of: receiving said multi-carrier

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modulated signal (fig.3); a mixer is the same as the claimed (down-converting) (see fig.3 element 34) said received multi-carrier modulated signal; performing an amplitude-demodulation (see figs.11, 13 elements 801, 901 and col.4, line 8-20) of said down-converted multi-carrier modulated signal in order to generate an envelope (see fig.3 element 46); performing said frame synchronization (see col.3, lines 20-21) based on the detection of said signal reference pattern; extracting (see fig.3 element 47) said reference symbol and said at least one guard interval (see fig.3 element 49) from said down-converted received multi-carrier modulated signal based on said frame synchronization; performing a Fourier transform (see fig.3 element 51) in order to provide a sequence of spectra from said at least one useful symbol; de-mapping (see fig.3 element 59) said sequence of spectra in order to provide a bit stream.

However Ishikawa does not teach correlating said envelope with a predetermined reference pattern in order to detect the signal reference pattern of said reference symbol in said multi-carrier modulated signal.

Seki teaches correlating said envelope with a predetermined reference pattern in order to detect the signal reference pattern of said reference symbol in said multi-carrier modulated signal (see fig.5 element 318 and col.7, lines 23-35).

It would have obvious to one of ordinary skill in the art to implement the teaching of Seki into Ishikawa as to indicate a peak when the reception pattern matches with the transmission pattern as taught by Seki (see col.7, lines 25-27).

As per claims 62, 85, Ishikawa does include the step of performing a fast automatic gain control (see fig.3 element AGC) of said received down-converted multi-carrier modulated signal prior to the step of performing said amplitude-demodulation.

As per claims 63, 86 Ishikawa does include the step of performing said amplitude demodulation comprises the step of calculating an amplitude (see fig.3 element 46) of said multi-carrier modulated signal.

As per claims 64-65, 87-88 Ishikawa does include the steps of sampling (see fig.3 element 44) respective amplitudes of said received down-converted multi-carrier modulated signal. Furthermore implanting a step of comparing said sampled amplitudes with a predetermined threshold in order to generate a bit sequence in order to perform said amplitude demodulation into Ishikawa would have been obvious to one skilled in the art as to indicate a peak when the reception pattern matches with the transmission pattern as taught by Seki (see col.7, lines 25-27).

As per claims 66, 89, Ishikawa does include the step of applying a result of the frame synchronization for a frame (see col.3, lines 20-25) in said signal to at least one subsequent frame in said multi-carrier modulated signal.

As per claims 67-68, 90-91, Ishikawa would include the step of detecting a location of said signal reference pattern based on an occurrence of a maximum of a correlation signal when correlating said envelope with said predetermined reference pattern as to indicate a peak when the reception pattern matches with the transmission pattern as taught by Seki (see col.7, lines 25-27).

As per claims 69, 92, Ishikawa would include the step of: disabling the step of performing said frame synchronization for a predetermined period of time after having switched-on a receiver performing said method for frame synchronization as to accurately retrieve the best reception signal.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Suzuki U.S. Patent No 6,173,016 B1 teaches a transmission method.

Van Nee U.S. Patent No 6,175,550 B1 teaches an orthogonal frequency division.

Keevill et al U.S. patent No 6,687,315 B2 teaches a single chip VLSI implementation.

Seki et al U.S. Patent No 5,602,835 teaches OFDM synchronization.

Kaneko U.S. patent No 6,009,073 teaches a method for transmitting an orthogonal frequency division.

Takahashi et al U.S. patent No 5,657,313 teaches a signal transmitting apparatus.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Emmanuel Bayard whose telephone number is 703 308-9573.

The examiner can normally be reached on Monday-Friday (7:Am-4:30PM) Alternate Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammed Ghayour can be reached on 703 306-3034. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

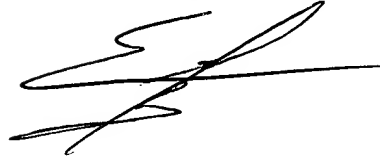
Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Emmanuel Bayard
Primary Examiner
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Wednesday, March 03, 2004

A handwritten signature in black ink, appearing to be 'EB', written over a horizontal line.